HEALTH MATTERS.

Bacteriology of Snow.

THE following extract from the *British Medical Journal* treats of a subject which is of great interest and decidedly novel: —

"While the bacteriology of ice and hail-stones has been studied with considerable success by Drs. Fränkel, Bischoff, Mitchell Prudden, Pumpley, Hills, Stoben, A. V. Poehl, Bordone-Ufreduzzi, Bujwid, etc., that of snow has been up to the present almost wholly neglected. Even in Russia the subject has been touched only in a cursory way by Professor A. V. Poehl of St. Petersburg, in the *Vratch*. In it he points out (1) that snow always contains viable microbes liquefying gelatine; (2) that, when snow falls, the first portions invariably contain greater numbers of bacteria than the subsequent ones (for example, 8,324 per cubic centimetre of snow-water, against 3,380 several hours later); (3) that, when snow lies on the ground, the superficial layers become richer in microbes (for example, 780 just after the fall, against 962 about three hours later). The fact is of interest from a sanitary point of view, as Dr. Poehl's researches furnish an additional proof that exposure of microbes to low temperatures does not destroy their vitality; at least, in certain species of micro-organisms.

"In many countries, such as Russia or Sweden, snow forms, so to speak, a natural ground or soil during several months of the year, receiving excrementitious matter and every possible kind of refuse and filth. In spring, when the snow melts, it is imbibed by the soil, carrying with it all the polluting matters referred to. Hence an interesting question arises, 'Are such microbes as happen to be present in these matters in any way changed by their contact with snow, or not?' This point can be determined only by further bacterioscopic researches.

"A contribution to the subject has just been published by Dr. F. G. Ianovsky of Kiev, who has examined bacterioscopically, under Professor K. G. Tritshel's guidance, a February snow in its purest state, collected both immediately and from one to three days after its fall. This observer has found: 1. That, even when collected during its fall, snow is invariably found to contain living bacteria in considerable numbers, varying from 34 to 463 per cubic centimetre of snow-water. 2. That their number does not decrease from exposure of snow to low temperatures (—16° C.) for several days. 3. That the following three species of microbes are met with constantly in great numbers: (*a*) a large diplococcus composed of ovoid cocci, endowed with energetic motion, and characterized by its rapidly liquefying jelly (the test-tube culture on the third day, forming greenish colonies along the track of the needle, assumes the shape of a funnel-like sac with a whitish flocculent deposit, while on the fifth the whole medium becomes liquefied, the precipitate sinking to the bottom; on agar, a pale grayish-white streak is formed at the site of inoculation, on potato a fairly thick white film); (*b*) small-sized cocci, often arranged two and two, energetically mobile, and slowly growing on jelly without liquefying the medium, the growth proceeding solely along the track of the needle in the shape of a narrow stripe consisting of non-coalescing minute points of a yellow color, while on the surface the colony is seen as a grayish-white, circular, slightly prominent patch with somewhat fringed edges (on agar, the coccus forms a white streak with sinuous edges; on potato, a gray film with a brownish tint); (*c*) very large cocci, liquefying jelly as late as three weeks after inoculation, and growing along the track of the needle in the form of a sharply defined streak of a beautiful pink color, with a slightly elevated pink circular patch or 'cap' on the surface (on agar the microbe forms a freely spreading white film with a rosy tint; on potato, a thick, tallow-like, pink coat, with sharply defined fringed contours). 4. That the first two species, (*a*) and (*b*), are also met with commonly in the water of the river Dnieper, which flows through the town, while the peculiar pink micrococcus seems to occur only in snow. 5. That, generally speaking, the microbes liquefying jelly in falling or recently fallen snow are met with invariably in far greater numbers than in snow which has been on the ground for some time; this, in fact, very often contains only such bacteria as do not liquefy gelatine. 6. That the bacteria of snow originate partly from aqueous vapors which are transformed into snow; partly and chiefly from the air, that is, they are carried away by the snow-flakes on their passage through the atmosphere."

SCARLET-FEVER. — At the annual meeting of the Rhode Island Medical Society, Charles V. Chapin, M.D., the health-officer of Providence, read a most valuable paper on the method for the prevention of scarlet-fever. In speaking of the origin of the disease, he said that where and when scarlet-fever first appeared is not known, but it has certainly prevailed continuously in Europe since the middle ages, and thence has spread to many other parts of the world. In 1735 it first appeared in this country at Kingston, Mass. It quickly broke out in Boston, a little later in New Hampshire, and gradually within a few years spread over New England, reached New York, and appeared in Philadelphia in 1746. Thence it extended down the coast, and passed over the Alleghanies into Kentucky and Ohio in 1791 and 1793. In 1851 it appeared in California. It was carried to New Zealand and Australia in 1848. During the first part of this century it was imported into Madeira, where it disappeared in 1814, only to re-appear in 1824. In South America it is said to have been prevalent in 1796, but became extinct, and appeared again in Chili in 1829, and in 1831 in Buenos Ayres, whence it spread in 1832 to Brazil. It first appeared in Iceland in 1827, in the Bahamas in 1845, and it was carried to India in a transport-ship in 1870. We know that the aborigines of Africa, North and South America, and Australasia were entirely exempt from this disease until the advent of Europeans. We know also that the early settlements were exempt often for many years; and we know that, in some cases at least, the direct transportation of the disease can be traced. These general facts, taken by themselves and without the corroboration of other testimony, show almost conclusively that scarlet-fever must be due to a material poison introduced from without the body, which poison must be intimately associated with the bodies of the sick. The hypothesis that the disease can be due to any atmospheric or telluric conditions is absolutely untenable. We should cease to talk about mysterious epidemic influences. Specific, by which is meant infectious, diseases can only be caused by specific poisons; and, though obscure meteorological conditions may favor or hinder the development and spread of these poisons, they cannot produce them. If scarlet-fever can be carried in ships half round the globe, or in emigrant trains hundreds of miles across uninhabited continents, and, set free at the journey's end, spread without hinderance, it must be caused by a specific poison. He refers to the work which has been done by Ecklund, Klein, Edington, and others, in the search for the germ of the disease, and comes to the conclusion that it has not as yet been discovered. Extended reference is made to the investigation which was made by *Science* in 1887 and 1888. He summarizes our knowledge of scarlet-fever in saying that it is a contagious disease, the virus of which behaves exactly as if it were a living organism; that it probably does not develop outside the living body, it is probably received through either the alimentary or respiratory mucous membrane; after a brief incubation, the disease is established, and the poison is thrown off from the mucous and cutaneous surfaces as long as inflammation exists or desquamation continues, and is thus disseminated in the air and attached to various articles, is carried from place to place, retaining its vitality for many months. For the prevention of the spread of the disease, he rcommends that the patient be isolated; that a sheet wet with corrosive sublimate be hung before the door of the room which he occupies; that the patient be thoroughly anointed, including his head, morning and night, with the following, advised by Jamieson: carbolic acid, 10 to 30 grains; thymol, 10 grains in an ounce of ointment. Where it becomes necessary, and hospitals exist, patients should be removed to these institutions. At the close of the sickness, every thing should be disinfected. Dr. Chapin concludes his paper by quoting statistics from the report of boards of health, especially those of Massachusetts and Michigan, which demonstrate that sanitary measures have greatly reduced the prevalence of the disease.

DIPHTHERIA. — Dr. J. Lewis Smith, in a paper read before the New York County Medical Association, entitled "The Cause, Mode of Propagation, and Prevention of Diphtheria," says the ex-

treme contagiousness of diphtheria from person to person is well known, and the virus adheres tenaciously to objects on which it happens to alight. The clothing of a patient, even when the disease is of the mildest form, his bedding, the furniture of his room, and the objects which he handles, may for weeks afterward communicate the disease. Dr. Sternberg, in his recent Lomb Prize essay, also mentions the fact that all damp, foul places, such as sewers, cellars, and ill-ventilated spaces under floors, afford conditions favorable for the development and propagation of the diphtheritic virus. The virus, once received, may be propagated in such a place for an indefinite time; and, ascending in the vapors which arise from this culture-bed, it is liable to communicate the disease to any one who inhales it. Thus in New York City prior to 1850, although foul sewers and unsanitary conditions existed, there was no diphtheria; but in the decade following 1850 this disease was introduced. The germ made its way into the sewers under ground; and now, wherever sewer-gas escapes into the domiciles of the city, it carries with it the diphtheritic poison. The amazing vitality and power of propagation of this virus are apparent when we reflect that it has permanently infected the New York sewers, so that children in all parts of the city are constantly falling ill with the disease.

THE BACILLUS OF TUBERCULOSIS. — According to M. Moulé, domestic fowls are frequently the subjects of tuberculosis, the disease often involving the abdominal organs. *Paté de foie gras* is sometimes almost a pure culture of tubercle bacilli. Dr. Squire of the London Epidemiological Society states that the bacillus of tuberculosis may enter the body (1) by inoculation through a cut or scratch; (2) by means of the genito-urinary mucous membrane; (3) by the product of conception, and by direct hereditary transmission; (4) by the mucous membrane of the alimentary canal; (5) by the mucous membrane of the respiratory tract, and by the air-cells of the lungs. The possibility of infection through the ailmentary tract assumes importance from the prevalence of tuberculosis in animals which are used as food, and from the experimental proof of the infectiousness of the milk of tuberculous cows. The present state of knowledge on the subject points very strongly to the necessity for careful inspection of cattle kept for dairy purposes, and for precautions in using the milk, and possibly also the flesh, of diseased animals.

THE CONTAGIOUSNESS OF TUBERCULOSIS. — The New York Board of Health has passed the following resolution: Resolved, that Drs. T. M. Prudden, H. M. Biggs, and H. P. Loomis, the pathologists of this department, be and are hereby requested to formulate a brief and comprehensive statement regarding the contagiousness of tuberculosis in man, stating therein the evidence of the same, and recommending, in the briefest possible manner practicable, the simplest means of protection from its influence.

LEAD-POISONING. — At a meeting of the Practitioners' Society of New York, Dr. Kinnicutt, the president, reported two cases of lead-poisoning occurring from an unusual source. The first patient was admitted to St. Luke's Hospital, suffering from lead colic and "wrist-drop." He had been employed as a florist; and on investigation by Dr. Vaughan, the house-physician, it was found he had been in the habit of biting off the ends of the tinfoil used as wrappers for hand bouquets. The tinfoil used for this purpose contained as much as eighty per cent of lead. There was no history of other sources of lead-poisoning. The second patient was admitted to the hospital, suffering from lead colic, and presenting a typical blue gum-line. He had been in the habit, for several weeks, of drinking beer from bottles which, he said, were cleaned by his employer with lead shot. Dr. R. F. Weir recalled the fact that several cases of lead-poisoning, some years ago, had been traced to the use of a popular brand of chewing-tobacco which was wrapped in tinfoil. Dr. Dana referred to some cases of poisoning which had been traced to the consumption of certain beverages coming in bottles with so-called patent stoppers. He said that he had recently had two Chinese patients in his hospital service, both of whom were suffering from lead-poisoning. He was unable to trace the source of the poisoning.

ELECTRICAL NEWS.

AYRTON AND PERRY'S SECOHMMETER AND SECOHM STANDARD. — In default of a full description, we have to content ourselves with the announcement that Professors Ayrton and Perry will shortly put a standard secohm on the market as an accessory to their secohmmeter. The advantage of such a standard is evident, since it reduces the manipulations with the secohmmeter to a very few simple ones, and dispenses with the use of a speed-counter, or tacheometer, for absolute determinations with the mentioned instrument. This standard secohm will be used much in the same way as any standard resistance would be used in the Wheatstone bridge; in fact, the secohmmeter is nothing more than a very nicely constructed double commutator. Descriptions of the secohmmeter proper appeared in several of the electrical papers some time since. Nothing, however, was said about the use of this instrument. Through James W. Queen & Co., the sole agents for the Ayrton and Perry instruments, we have received a full description explanatory of the mode of using the secohmmeter for determining absolutely, or comparing, the co-efficients of self-induction. This description will be found on another page.

TOPEKA ELECTRIC RAILWAY. — The Topeka Rapid Transit Railway, the equipment of which has just been finished by the Thomson-Houston Electric Company, was put in operation on April 3. This road is said to be the longest in the world (14 miles, 20 miles of track). The trial trip was made on Wednesday, April 3, with four cars filled with invited guests, including the managers and chief officials of the Topeka City Street Railway and the East and West Side Circle Railways, and was satisfactory. The electrical apparatus consists of six 30-horse-power Thomson-Houston generators. The residents of Topeka are enthusiastic, and it is predicted that ere long electricity will be in general use on all the street-railways in the city.

EARTHING LIGHTNING-CONDUCTORS BY MEANS OF GAS AND WATER PIPES. — In the *Elektrotechnische Zeitschrift* (vol. xx. p. 473), A. Voller has an article on the above subject, an abstract of which appears in the *Journal of the Institution of Electrical Engineers*, No. 77. It is generally assumed that the path of the discharge follows only the line of least resistance, and no attention has been paid to the fact, on which Mr. Voller insists, that the direction of the discharge is chiefly influenced by the state of electric potential of the buildings in closest proximity to the charged cloud. The better the connection of the metallic masses in buildings is with the earth, the higher will be the potential of the induced electricity, and the greater likelihood is there of a discharge taking place between the cloud and the points in question. Since the general introduction of gas and water pipes into our houses, it is these which offer the least resistance between the roofs and earth. Hence, if a charged cloud should pass over such a house, the gas and water pipes must be at a higher potential, and there is much greater probability of the lightning entering the house through them than at any other point: in other words, it is more likely that the discharge will take place through the pipes than through the lightning-conductor; and, if the lightning-rod is not connected to the pipes, the discharge will find its way somehow to the latter, causing destruction in its path. At the request of the Hamburg fire insurance companies, Mr. Voller undertook to inspect cases of lightning-strokes, and to ascertain the point struck, as well as the path followed. A great many interesting cases investigated are duly recorded, but some general results only can be reproduced. It generally happened, that, when the building struck was unprovided with a lightning-conductor, the lightning struck some part of the roof or walls, found its way to the gas and water pipes, and then passed harmlessly to earth. In the few cases where lightning struck a building fitted with a lightning-conductor, the discharge jumped over from the conductor to the pipes. In fifteen cases which were specially investigated in the years 1884 and 1888, after the lightning had done more or less damage at the point where it struck, and in the immediate neighborhood, it was found that in nine cases the discharge made its way to earth through the water-pipes, in two cases through the gas-pipes, in two cases through rain-pipes, in one case probably through the lightning-conductor of